

## #Reviewer 1-RC1

We want to thank referee 1 for the critical review of our manuscript and for the positive words about our paper and its contribution. We have reflected on the comments and below are our point-to-point response (in bold, with the original reviewer comment in normal format) to the questions raised.

### *Major comments*

- The first thing I would suggest to the authors is that they carefully review the text to avoid several grammar errors and typographical errors prevalent in the manuscript (I list some of these errors at the end of the review as examples).

**We agree. We will carefully review the manuscript text for the suggested grammatical errors and any other errors we may have missed.**

- Studies have developed and used a wide range of meteorological drought indices. Could authors briefly explain why they selected/prefer SPI over other indices?

**We preferred to use SPI over other indices because we learned from the National Drought Management Authority of Kenya, that they used SPI specifically for the monitoring of drought in the country. This is also like the other organizations delivering climate services to Horn of Africa like IGAD Climate Prediction and Application Centre (ICPAC) in their East Africa Drought Watch. Several studies in the Horn of Africa have also applied SPI. In our study, we do not only use standardized indices like SPI, we also compare SPI to threshold-based indices and compare how standardized and threshold-based indices characterize drought propagation in the region. We will clarify this in the revised version**

- Authors did not explain/mentioned how they identify drought events based on these standardized indices (onset and termination of drought events). Since these standardized indices encompass both droughts and non-drought periods.

**In the analysis, we tested two separate methods. The first was the standardized indices method which included standardized wet and dry periods to characterize *drought months*. As such we did not identify drought events using standardized indices, but rather the relative dryness over different accumulation periods without defining whether it's a drought event or not. The second method was the threshold-based indices which we applied a threshold (70<sup>th</sup> percentile) to characterize *drought events* (Heudorfer and Stahl, 2017). So here we do identify events and define it in terms of duration. We applied a variable threshold (without pooling) which changed each month over the years. Each of these methods highlighted different aspects of the drought. The threshold-based duration preserved the original hydrological values and estimated how long the water shortage lasted while the standardized indices failed to preserve the hydrological values, but no (arguably arbitrary) threshold had to be used. However, both methods do say something about the number of dry months, but in different ways: either as duration of an event, or the accumulation period. We will explicitly mention this in our explanation in the Methods section.**

- Is there any reason for having different interval classes in Figure 1b? If not, then I would suggest that the class interval and color scale be changed with distinct colors for the classes.

**There was no reason for this. We did this because the list of elevation values were too many and we needed to try to display all the classes, hence the use of intervals. We agree to change the color scheme as suggested.**

- Figure 2: The authors mentioned two drought characteristics i.e., duration and severity/deficit volume. However, the entire paper focuses exclusively on the duration of the drought. Therefore, it is recommended that the severity/deficit volume analysis be added or removed from Figure 2.

**We agree these parts should be removed from Figure 2.**

### ***Minor Comments***

**We will address all the below minor comments in the revised version of the manuscript**

- It is preferable to have different color boundaries for the countries so that the location of each country can be identified immediately.
- Figure 2: The resolution of the figure is quite low
- I believe this paragraph should be placed in the introduction rather than on lines 124-132
- Lines 209-211: It is appropriate to provide these results as supplementary information.
- Typos and English grammar (examples)
- Line 15-16: “and by calculating the ratio between the threshold respectively streamflow drought duration”. The use of respectively is not clear, please rephrase
- Line 425: We find differences in propagation from precipitation to soil moisture to also be influenced by ....
- Line 509: repetition of the sentence (As such, the dataset tends to overestimate streamflow in arid and semi-arid areas).

### **REFERENCE**

Heudorfer, B. and Stahl, K.: Comparison of different threshold level methods for drought propagation analysis in Germany, *Hydrol. Res.*, 1311–1326, <https://doi.org/10.2166/nh.2016.258>, 2017.